REMARKS

Present Status of the Application

It is noted with great appreciation that Office Action considers claim 16-17 as being allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. In addition, the Office Action has rejected claims 15 and 18-26 as being unpatentable over AAPA in view of Tsuji (USP 5656550 and further in view of Cox (USP 5807610).

The Applicant has most respectfully considered the remarks set forth in this Office Action. Regarding the obviousness rejections, it is however strongly believed that the cited references are deficient to adequately teach the claimed features as recited in the amended claims. The reasons that motivate the above position of the Applicant are discussed in detail hereafter, upon which reconsideration of the claims is most earnestly solicited.

Objections to the Specification and the Claims

The specification and claim 15 have been objected to various informalities. In response thereto, Applicants have amended the informalities as noted by the Examiner. Withdrawal of the objections is courteously requested.

Response to 35 U.S.C. 103 rejection

Claims 15 and 18-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over AAPA (figs. 1a to 1e) in view of Tsuji et al. (Tsuji heterinafter, US patent no.5656550) and further in view of Cox et al. (Cox hereinafter, US patent no. 5807610).

The PTO can satisfy its burden of establishing a prime facie case of obviousness "only by showing some objective teaching in the prior art or that knowledge generally available to one of ordinary skill in the art wold lead that individual to combine the relevant teachings of the references." *In re Fine, 837 F.2d 1071, 5 U.S.P.Q. 2d 1595, 1598 (Fed. Cir. 1988).* "Moreover, the question is not simply whether the prior art 'teaches' the particular element of the invention, but whether it would 'suggest the desirability, and thus the obviousness, of making the combination.'" *ALCO Standard Corp. v. Tennessee Valley Authority, 808 F.2d 1490, 1498, 1 U.S.P.Q. 2d 1337, 1343 (Fed. Cir. 1986).* As described in detail hereinafter, Applicants respectfully assert that AAPA in view of Tsuji and further in view of Cox is legally deficient for the purpose of rendering claim 15 unpatentable.

The present invention provides a method for forming an integrated circuit package, wherein the method comprises forming a plurality of first electroplate layers and second electroplate layers on the first surface and the second surface, respectively of a metal substrate; and etching the metal substrate on the first surface to form a die pad and a plurality of first metal pegs using the first electroplate layers and a mask layer as an etching mask, wherein the first metal pegs and the first electroplate layers are positioned around the die pad. A silicon die is then attached onto the die pad, and the die is electrically connected to the first electroplate layers, wherein the area the die pad region is smaller than the area of the die. Contrary to the Office's

assertion, AAPA fails to disclose the aforementioned claimed features. Instead, AAPA simply teaches patterning the copper substrate 100 to form a plurality hemispherical cavities 108 in which the die 112 is electrically connected to electrode layers 110 inside the cavities 108. First of all, a metal peg of the present invention, by the definition of the Webster's new World College Dictionary, is a projecting pin or bolt, whereas the AAPA teaches forming cavities. Secondly, the metallic film 110 or electrode layers inside the cavities 108 are formed on the hemispherical cavities 108 after the definition of the cavities. The present invention, on the other hand, teaches forming the electroplate layers first and then using the electroplate layers as etching mask to form the metal pegs. The present invention further teaches forming a die pad from the metal substrate and then forming a die onto the die pad, wherein an area of the die pad is smaller than an area of the die. The AAPA simply teaches bonding a die 112 onto the surface 102a of the copper substrate. Even construing the surface 102a of the copper substrate of AAPA as a die pad, the area of the die pad of AAPA is not smaller than the area of the die.

The Office Action also relies on Tsjui to cure certain deficiencies of the AAPA. The Applicants, however, respectfully submit that the combination still fails to explicitly teach or implicitly suggest the present invention. The Office Action contends that Tsjui teaches substantially the claimed invention of attaching a die 41 over the die pad, and connecting the die and the first electroplate layers electrically, wherein each area of the metal peg under the die pad is smaller than the area of the die. Applicants respectfully disagree. Tsjui teaches forming a plurality of pole terminal portions 28A, which are construed as the metal pegs of the present invention, on the first and second surfaces of a clad metal 60. Tsjui continues to teach filling the

cavities between the pole terminal portions with an insulating layer 51a, and covering the insulating layer 51a with an insulating layer 51b, followed by forming a patterned layer 52, which also serves as a die pad for supporting the chip 41, over the second insulating layer 51b and the pole terminal portions 28. The chip 41 is subsequently formed over an insulating layer 53, which is formed on the patterned layer 52. The chip 41 of Tsjui, therefore, is not attached onto the die pad directly. Further, the chip of Tsjui is electrically connected to the patterned layer 52, which serves as the die pad, and is not directly connected to the pole terminal portions 28 or the metal pegs as taught in the present invention. Further, the present invention teaches the area of the die pad region is smaller than the are of the die. However, the area of the die pad or the patterned layer 52 of Tsjui is larger than the area of the chip 41. In addition, the present invention also teaches enclosing the die, the die pad, the first electroplate layers and the first metal pegs above the first surface of the metal substrate after the formation of the die and the die pad in one molding process. In accordance to Tsjui's method, the encapsulation of the package is accomplished in two separate steps.

Cox teaches a printing substrate. Cox is completely silent about using the second electroplate layers and the circuit line mask to forming a plurality of second metal pegs and a plurality of printed circuit lines.

For at least the above reasons, Applicants respectfully submit that AAPA, Tsuji, and Cox nether alone nor in combination, renders claim 15 unpatentable. Withdrawal of the rejection under 35 U.S.C. 103(a) is thereby earnestly requested. For the same reasons as applied to claim 15, Applicants also submit that claims 16-26 are deemed patentable.

Newly added Claims

New claim 27 recites a step of enclosing the die, the die pad, the first electroplate layers and the first metal pegs above the first surface of the metal substrate in one molding operation, which further distinguishes over the cited references. Thus, claim 27 is believed patentable.

CONCLUSION

For at least the foregoing reasons, it is believed that all pending claims 15-27 are in proper condition for allowance. If the Examiner believes that a telephone conference would expedite the examination of the above-identified patent application, the Examiner is invited to call the undersigned.

Respectfully submitted,

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